Oral Health & Dental Science

Walking bleach, an Approach to Treating Dyschromia in Temporary Dentition: Case Report

Diana Alejandra Torres Tavera*, José Luis Ayala-Herrera, Gloria Anabel Godínez Pérez and Erika Cortés Guzmán

*Correspondence:

Department of Pediatric Dentistry, School of Dentistry, Universidad La Salle Bajío, León, Gto, México. Diana Alejandra Torres Tavera, Department of Pediatric Dentistry, School of Dentistry, Universidad La Salle Bajío, Avenida Universidad 602, Lomas del Campestre, 37150 León, Gto, México.

Received: 18 Apr 2025; Accepted: 10 May 2025; Published: 20 May 2025

Citation: Diana Alejandra Torres Tavera, José Luis Ayala-Herrera, Gloria Anabel Godínez Pérez, et al. Walking bleach, an Approach to Treating Dyschromia in Temporary Dentition: Case Report. Oral Health Dental Sci. 2025; 9(2); 1-5.

ABSTRACT

Traumatic dental injuries in primary dentition are associated with multiple dental, aesthetic, and psychological consequences. Dental dyschromia is the primary reason parents seek treatment for their children. The conservative approach of using the walking bleach technique is employed to address the aesthetic concerns of non-vital teeth. However, there is currently no reported data on the long-term effectiveness of this treatment in deciduous dentition. Two young male patients, aged 4 to 5 years, presented at the clinic with concerns about the appearance of their teeth due to dental dyschromia. Conventional pulpectomy was performed, followed by two sessions of the walking bleach technique as per the protocol. Follow-up examinations were conducted at 1, 3, and 6 months. The walking bleach technique demonstrated immediate satisfactory aesthetic outcomes in deciduous dentition; however, long-term recurrence was observed. This indicates that internal whitening by itself is insufficient to address the effects of pulp necrosis in cases of dental dyschromia.

Keywords

Dental bleaching, Walking bleach, Primary Dentition, Dyschromia, Case Report, Follow-up.

Introduction

Dental trauma is defined as injuries caused by direct and indirect impact forces on the teeth, periodontium and surrounding soft tissues [1,2]. In primary dentition, it is linked to various dental, aesthetic, and psychological consequences [3]. The primary upper central incisors are the most commonly affected teeth and dyschromia is the most common reason why parents seek treatment for their children [4].

The term dyschromia describes the existence of irregular dentinal pigmentation or differences in hue between teeth. It can be caused by intrinsic, extrinsic, or internal factors and is a common occurrence in the general population. Traumatic oral injuries are frequently associated with intrinsic dyschromia [5,6].

After experiencing dental trauma, a dark-gray discoloration may manifest, which some researchers believe to be an indicative sign of pulp necrosis. The prevailing theory suggests that this discoloration occurs due to intrapulpar hemorrhage, where blood components diffuse into the dentinal tubules [7]. This diffusion leads to the release of iron through the hemolysis of erythrocytes. Consequently, the pulp tissue undergoes a degradation process, ultimately resulting in necrosis. In response to the sulfated products of bacterial metabolism, ferrous sulfide is formed, which is a black and pigmented substance responsible for brown/reddish and black discolorations. It is worth noting that teeth that maintain vitality can gradually regain their normal color within weeks following the trauma [8].

In primary dentition, dyschromia does not usually require

treatment; however, if clinical or radiographic signs of infection or necrosis are present, a pulpectomy is necessary [9,10].

Internal bleaching is a conservative, minimally invasive, relatively simple, and low-cost intervention to treat the aesthetics of nonvital teeth [11]. A negative self-image due to a discolored tooth could be considered an appropriate indication for bleaching [12]. Hydrogen peroxide, carbamide peroxide, and sodium perborate are whitening agents that have been extensively researched [13]. These three agents possess oxidative properties and their primary role is to induce a spontaneous dissociation in water, resulting in the release of free oxygen radicals. These radicals then interact with chromophore molecules, causing the disruption of the covalent bonds that provide dimensional stability. Consequently, the formation of substances with reduced molecular weight occurs, leading to decreased reactivity towards light radiation and ultimately resulting in tooth color lightening [14].

The Walking Bleach technique (WBt), the Thermo-Catalytic technique, and the Internal/External whitening technique are some of the various internal whitening options [15]. WBt has been primarily used in permanent dentition, although there have been a few reported cases of its use in deciduous dentition [16-18]. WBt involves applying a whitening agent in the pulp chamber of a non-vital dyschromic tooth for several days and then replacing it until the desired aesthetic result is achieved [16]. Currently, literature supports the immediate effectiveness of WBt in deciduous dentition. However, the objective of this case report is to assess the long-term effectiveness of WBt in deciduous dentition with a 6-month follow-up.

Case Report

Case 1: 5-year-old male patient presented with a primary maxillary right central incisor that had experienced trauma 1 year ago, clinical dyschromia and minimal loss of coronal structure, radiographic evidence of periapical lesion with no fractures (Figure 1).



Figure 1: Initial situation. a) Extraoral photo b) Clinical appearance of the primary maxillary right central incisor. c) Periapical x-ray of the maxillary central incisors.

Conventional pulpectomy was performed under supraperiosteal infiltration using Lidocaine/Epinephrine 1:100,000 (ZEYCO) with

a dosage of 18 mg. Absolute isolation with rubber dam, access to the pulp chamber was gained using a round carbide bur, coronal pulp was then removed using a spoon excavator. Conductometry with 21 mm K-type files (Dentsply Sirona), working length at 12 mm, manual instrumentation up to file #60. Saline solution was used for irrigation, canals were dried using paper points, final obturation done with Ultrapex. A protective cervical barrier was placed 2 mm below the cementoenamel junction using glass ionomer Fuji 9 and provisional filling was done with PTFE tape and Systemp Inlay.

In a second appointment, WBt was performed with absolute isolation. The removal of Systemp inlay and PTFE tape was accomplished using an explorer. The cavity was cleansed with sodium hypochlorite, followed by the application of 40% Hydrogen Peroxide (Opalescence Boost) using a micro-brush. A cotton swab with the whitening agent was left inside the pulp chamber and a temporary filling was made using Systemp Inlay. This procedure was repeated after 7 days. The bleaching agent was rinsed out with hydrogen peroxide; one week after the whitening process, the tooth was restored using a bleach-type composite (Figure 2). Follow-up was conducted at 1,3 and 6 months post-treatment (Figure 3).



Figure 2: Walking bleach technique in primary maxillary right central incisor. a) Whitening agent application b) Placement of a swab with bleaching agent c) and d) Definitive restoration with bleach-type composite.



Figure 3: Follow-up of Walking bleach technique in primary maxillary right central incisor. a) Initial situation. b) Immediate result and restoration with bleach-type composite c) Follow-up after one month d) Follow-up after 3 months e) Follow-up after 6 months.

Case 2: 4-year-old male patient, with primary maxillary left central incisor and history of trauma 6 months ago, previously treated. Clinical dyschromia, absence of temporary filling and incisal enamel fracture with chronic abscess, radiographic evidence of poor obturation quality with minimal external resorption, no fractures (Figure 4).



Figure 4: Initial situation a) Clinical appearance of the primary maxillary left central incisor b) Occlusal x-ray of the maxillary central incisors

Retreatment and WBt were performed with the same specifications as the previous case. One month after whitening, the tooth was restored with a 3M ESPE celluloid crown. Follow-up for 1,3 and 6 months (Figure 5).



Figure 5: Follow-up of Walking bleach technique in primary maxillary left central incisor. a) Initial situation. b) Result of the first session with walking bleach technique. c) Result of the second session with walking bleach technique. d) Follow-up after one month and restoration with celluloid crown e) Follow-up after 3 months f) Follow-up after 6 months.

Discussion

WBt in permanent dentition can improve long-term aesthetics, however in deciduous dentition there are few studies, based mainly on case reports, that use this technique and show its effectiveness [17,18]. The main difference between an endodontic treatment in permanent teeth and a pulpectomy in deciduous teeth is the intracanal filling material used.

The optimal requirements of an obturation material for primary teeth include biocompatibility, insolubility, radiopacity, easy resorption, bactericidal or bacteriostatic properties and absence of volumetric contraction [19].

Different filling materials have been tested, such as Zinc Oxide Eugenol (ZOE), calcium hydroxide, Iodoform pastes (Maisto Paste, Guedes-Pinto Paste,) combinations of calcium hydroxide with Iodoform (Vitapex, Ultrapex, Metapex), Endoflas, Calen Paste; but there's still no consensus on the gold standard material for primary teeth [20].

Scientific evidence has shown that calcium hydroxide/iodoform pastes have better properties than ZOE [21,22]. The main disadvantage of this material, as shown in this case, is the staining capacity it has due to the presence of iodine [23]. The yellowish coloration inside the root canal can compromise coronal aesthetics after the final restoration [24. It is necessary to evaluate the long-term aesthetic effectiveness of WBt with different intra-canal filling materials.

After pulpectomy, when performing WBt, a protective cervical barrier should be placed between the filling material and the bleaching agent to prevent or reduce the diffusion of peroxide. Glass ionomers have been preferred as a cervical barrier material over mineral trioxide aggregate (MTA) [25]. Literature reports that composite resins and Zinc phosphate cements should be avoided as cervical barrier during internal whitening due to its poor sealing capacity [26].

The provisional restoration during WBt must ensure a correct seal and the preservation of coronal marginal integrity. Whitening agents release oxygen during use, which causes an increase in intracameral pressure that causes a lack of adjustment in the restoration [27]. WBt requires an eugenol-free provisional filling material, the commonly used are Cavit G and Coltosol F [28]. Other provisional filling materials like Systemp Inlay have been used for its sealing properties and ease of removal, avoiding the need for a dental handpiece [29,30]. In these cases, Systemp Inlay was used to lower the patient's anxiety by minimizing the duration of each WBt session ensuring behavioral management [31,32].

Conclusion

The paediatric dentist must possess a thorough understanding of the expected outcomes and potential risks when performing this treatment. WBt demonstrated immediate satisfactory aesthetic outcomes in deciduous dentition; however, long-term recurrence was observed. It is necessary to evaluate the effectiveness of this technique with different intra-canal filling materials that report a lower staining capacity and simultaneously meet the requirements for a filling material in deciduous dentition, in order to make treatment decisions based on long-term evidence.

Ethics Approval and Patient Consent Statement

Patients and their guardians were informed of the purpose of the treatment and the procedures to be performed during it. Participation was authorized through informed consent and patients nodded their heads. The protocol was reviewed by the ethics committee of the School of Dentistry La Salle Bajío University (ULSB).

References

- 1. Antipovienė A, Narbutaitė J, Virtanen JI. Traumatic Dental Injuries, Treatment, and Complications in Children and Adolescents: A Register-Based Study. Eur J Dent. 2021; 15: 557-562.
- Carrión Torres NS, Villavicencio Caparó E, Toledo Ortega CE. Prevalencia De Trauma Dentoalveolar En La Población De La Parroquia Urbana El Vecino Del Cantón Cuenca En El Año 2019. Eoug. 2021; 4: 14-19.
- 3. Fitzgibbon R, Carli E, Piana G, et al. Dental Trauma Epidemiology in Primary Dentition: A Cross-Sectional Retrospective Study. Applied Sciences. 2023; 13: 1878.
- 4. Goettems ML, Thurow LB, Noronha TG, et al. Incidence and prognosis of crown discoloration in traumatized primary teeth: A retrospective cohort study. Dent Traumatol. 2020; 36: 393-399.
- Vagge C. Modern Concepts for Teeth Whitening. Act Scie Dental. 2019; 3: 80-83.
- Sulieman M. An Overview of Tooth Discoloration: Extrinsic, Intrinsic and Internalized Stains. Dent Update. 2005; 32: 463-471.
- Holan G, Fuks AB. The diagnostic value of coronal dark-gray discoloration in primary teeth following traumatic injuries. Pediatr Dent. 1996; 18: 224-227.
- 8. Kahler B. Present status and future directions Managing discoloured teeth. Int Endodontic J. 2022; 55: 922-950.
- Ashu A. Etiology And Management Of Traumatic Dental Injuries In Children Less Than 12 Years Old In Yaoundé. Romanian Journal of Oral Rehabilitation. 2021; 13: 2066-7000.
- 10. Day PF, Flores MT, O Connell AC, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. Dental Traumatology. 2020; 36: 343-359.
- Wood K, Lyne A, O Donnell K, et al. Patient-reported outcome measures for children and adolescents having dental bleaching in the UK. Eur Arch Paediatr Dent. 2022; 23: 579-586.
- 12. Policy on the Use of Dental Bleaching for Child and Adolescent Patients. Pediatr Dent. 2016; 38: 81-83.
- Traviglia A, Re D, De Micheli L, et al. Blanqueamiento Rápido: La Importancia De La Obturación Temporal Con Un Sellado Hermético. The International Journal Of Esthetic Dentistry. 2019; 12.

- 14. Sharma D, Upadhyay G, Aidasani B, et al. Walking bleach with sodium perborate tetrahydrate: A safer material and method. Ann Prosthodont Restor Dent. 2018; 4: 76-78.
- 15. Coelho AS, Garrido L, Mota M, et al. Non-Vital Tooth Bleaching Techniques: A Systematic Review. Coatings. 2020; 10: 61.
- 16. Knezevic N, Obradovic M, Dolic O, et al. Clinical Testing of Walking Bleach, In-Office, and Combined Bleaching of Endodontically Treated Teeth. Medicina. 2022; 59: 18.
- 17. Amer M. Intracoronal tooth bleaching A review and treatment guidelines. Aust Dent J. 2023; 68: 141-152.
- Filho X, Cezária T, Rodrigues A, et al. Blanqueamiento de un diente temporal traumatizado: a propósito de un caso. Odontología pediátrica. 2012; 20: 146-151.
- 19. Manzoor DR, Manzoor M. Obturating materials in pediatric dentistry: A review. Int J Appl Dent Sci. 2021; 7: 175-1782.
- Rajsheker S, Mallineni SK, Nuvvula S. Obturating Materials Used for Pulpectomy in Primary Teeth- A Mini Review. J Dent Craniofac Res. 2018; 3: 3.
- Navit S, Jaiswal N, Khan SA, et al. Antimicrobial Efficacy of Contemporary Obturating Materials used in Primary Teeth-An In-vitro Study. J Clin Diagn Res. 2016; 10: ZC09-ZC12.
- 22. Quintero de Lucas G, Discacciatti de Lrtora MS, Escobar M, et al. Evaluación clínica y radiográfica de distintas pastas de obturación radicular en dientes primarios. Rev Fac Odontol. 2012; 5: 7.
- Xavier SR, Pilownic KJ, Gastmann AH, et al. Bovine Tooth Discoloration Induced by Endodontic Filling Materials for Primary Teeth. Int J Dent. 2017; 2017: 1-5.
- 24. Cerqueira DF, Volpi Mello Moura AC, Santos EM, et al. Cytotoxicity, Histopathological, Microbiological and Clinical Aspects of an Endodontic Iodoform-Based Paste Used in Pediatric Dentistry: A Review. J Clin Pediatr Dent. 2007; 32: 105-110.
- 25. Ramazani M, Zarenejad N, Asgary S, et al. Coronal microleakage of three different dental biomaterials as intraorifice barrier during nonvital bleaching. Dent Res J. 2015; 12: 581.
- 26. Ordoñéz Aguilera J, Massunari Maenosono R, Ferracioli Oda D, et al. Sealing ability of materials used as protective cervical barrier in internal tooth bleaching. RSBO Revista Sul-Brasileira de Odontologia. 2017; 14: 67-73.
- Pallarés Serrano A, Pallarés Serrano A, Pallarés Serrano S, et al. Study of the Intra-Coronal Pressure Generated by Internal Bleaching Agents and Its Influence on Temporary Restoration. Applied Sciences. 2022; 12: 2799.
- 28. Srikumar GPV, Varma K, Shetty K, et al. Coronal microleakage with five different temporary restorative materials following walking bleach technique: An ex-vivo study. Contemp Clin Dent. 2012; 3: 421.
- 29. Erkut S, Caglar A, Yilmaz B, et al. Microleakage of different provisionalization techniques for class I inlays. Journal of Dental Sciences. 2013; 8: 1-7.

- Al Khowaiter SS, Al Bounni RS, Binalrimal S. Comparison of Dentinal Microleakage in Three Interim Dental Restorations: An In Vitro Study. J Int Soc Prev Community Dent. 2022; 12: 590-595.
- 31. Ghaffar RSA, Sheikh M, Kidwai M, et al. Impact of highspeed handpiece noise-induced dental anxiety on heart rate: analyzing experienced and non-experienced patients - a comparative study. BMC Oral Health. 2024; 24: 265.
- Antoniadou M, Tziovara P, Antoniadou C. The Effect of Sound in the Dental Office: Practices and Recommendations for Quality Assurance—A Narrative Review. Dentistry Journal. 2022; 10: 228.

© 2025 Diana AT Tavera, et al. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License